

WHAT IS CLAIMED:

1. Workpiece (1) with at least one functional face and a layer system (4) deposited on at least a portion of the functional face (4) as well as a structure pattern, which encompasses at least a portion of the layer system (4) and which is comprised of at least one threedimensional microstructure (5) with structure depth **S**, characterized in that the threedimensional microstructure (5) extends from the surface of the layer system (4) up into the workpiece, such that it is uncoated in a lower region of the microstructure (5).
5
2. Workpiece as claimed in claim 1, characterized in that at least the outermost layer of the layer system (4) comprises at least one carbon-containing slide layer such as a Me/C, MeC/C, SiC/C, DLC, an a-C:H:Si, an a-C:H:Si:Me or an a-C:H/a-Si:O layer, but preferably a WC/C or a DLC layer.
10
3. Workpiece as claimed in one of the preceding claims, characterized in that the ratio of the layer thickness **d** of the layer system (4) to the structure depth **S** is between 0.05 and 0.9, preferably between 0.1 and 0.6.
15
4. Workpiece (1) with at least one functional face and a layer system (4) deposited on at least a portion of the functional face, as well as a structure pattern which encompasses at least a portion of the layer system (4) and is comprised of at least one threedimensional microstructure (5) with structure depth **S**, and the layer system comprises at least one carbon-containing slide layer such as SiC/C, an a-C:H:Si, an a-C:H:Si:Me or an a-C:H/a-Si:O layer, but preferably a DLC, a Me/C, a MeC/C, in particular a WC/C layer, characterized in that the ratio of the layer thickness **d** of the layer system (4) to the structure depth **S** is between 0.05 and 0.9, preferably between 0.1 and 0.6.
20

5. Workpiece as claimed in one of claims 2 to 4, characterized in that the Me/C, MeC/C or a-C:H:Si:Me slide layer comprises at least one of the metals Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W or Fe, but preferably W or Cr.
6. Workpiece as claimed in one of claims 2 to 5, characterized in that the carbon-containing layer comprises a metallic adhesion layer and a carbon content increasing from the adhesion layer to the surface.
5
7. Workpiece as claimed in one of claims 1 and 3 to 6, characterized in that at least the outermost layer of the layer system comprises an MoS₂, a WS₂, an MoSe₂ or a WSe₂ slide layer.
- 10 8. Workpiece as claimed in one of the preceding claims, characterized in that the layer system comprises at least one hard layer and at least one slide layer deposited thereon.
9. Workpiece as claimed in one of the preceding claims, characterized in that the layer thickness of the layer system is between 0.5-20 µm, preferably between 1-10 µm.
- 15 10. Workpiece as claimed in one of the preceding claims, characterized in that the structure pattern in plan view is comprised of a multiplicity of substantially spot-form cavities, which, in turn, are disposed circularly, elliptically, in the form of lines, in the form of polygons or as hexagonal or cubic spot pattern.
11. Workpiece as claimed in claim 10, characterized in that the cavities, in turn, in plan
20 view have a circular, elliptical or polygonal shaping.
12. Workpiece as claimed in one of claims 1 to 9, characterized in that the structure pattern is formed of circular, elliptical, polygonal, straight or wave-form lines.

13. Workpiece as claimed in one of the preceding claims, characterized in that on the portion of the layer system, encompassed by the structure pattern, the degree of areal coverage is between 10-50%, preferably between 15-35%, of the microstructured surface.

5 14. Workpiece as claimed in one of the preceding claims, characterized in that the cross section of the cavities (5) is substantially circular (5'), however preferably substantially conical (5'', 5''').

10 15. Workpiece as claimed in one of the preceding claims, characterized in that a tangential angle α between the surface horizontal and a decreasing structure slope is less than 15°, however preferably less than 10°.

15 16. Workpiece as claimed in one of the preceding claims, characterized in that the structure pattern of the layer system comprises circular structures (5) with a diameter measured on the surface of 5 to 350 μm , however preferably 80 to 250 μm , and has a degree of areal coverage of 10 to 50%, however preferably between 15 to 40%.

17. Workpiece as claimed in one of the preceding claims, characterized in that the workpiece is a structural part with at least one functional face implemented as a slide face, in particular a friction bearing, slide seal, piston ring, bucket tappets, rocker arms or a crankshaft.

20 18. Workpiece as claimed in one of claims 1 to 17, characterized in that the workpiece is a tool with at least one functional face implemented as a slide face, in particular a cutting tool, with at least one contact face or a forming tool with at least one extrusion face.

19. Method for the production of a workpiece with at least one functional face, at least on a portion of the functional face first a layer system is deposited and subsequently microstructured in one or several structuring steps, characterized in that the structuring steps are selected such that the layer system as well as also the workpiece surface are microstructured.
- 5
20. Method as claimed in claim 19, characterized in that the at least one structuring step is selected such that the ratio of layer thickness **d** of the layer system (4) to the structure depth **S** is between 0.05 and 0.9, preferably between 0.1 and 0.6.
- 10
21. Method for the production of a workpiece with at least one functional face and a microstructured layer system (4) deposited thereon, at least on a portion of the functional face first the surface of the workpiece is microstructured through one or several structuring steps and subsequently a layer system is deposited, characterized in that the ratio of the layer thickness **d** of the layer system (4) to the structure depth **S** is set between 0.05 and 0.9, preferably between 0.1 and 0.6.
- 15
22. Method as claimed in claims 19-21, characterized in that the at least one structuring step is selected such that a degree of areal coverage of 10 to 50%, however preferably between 15 to 40% is set.
- 20
23. Method as claimed in claims 19 to 22, characterized in that the at least one structuring step comprises a micromechanical step, but preferably one of working with a laser beam.
24. Method as claimed in claims 19 to 23, characterized in that the at least one structuring step comprises plasma etching, chemical etching or electrochemical etching.

25. Method as claimed in claims 19 to 24, characterized in that the at least one structuring step comprises the application of an etch-resistant lacquer layer with a twodimensional structure pattern on the surface of the layer system or of the workpiece.
- 5 26. Method as claimed in claims 19 to 25, characterized in that the deposition of the layer system takes place by means of a PVD, a CVD process, but preferably by means of a combined PVD/CVD process..
- 10 27. Method as claimed in claims 19 to 26, characterized in that a layer system with at least one carbon-containing slide layer is deposited, such as an SiC/C, an a-C:H:Si, an a-C:H:Si:Me or an a-C:H/a-Si:O layer, but preferably a DLC, a Me/C, a MeC/C, in particular a WC/C layer.
28. Method as claimed in claims 19 to 27, characterized in that the layer thickness of the layer system is set between 0.5-20 µm, preferably between 1-10 µm.